Measuring abnormal returns on day trading - use of technical analysis

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MFIN Director

Date: August 28th 2013

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Abstract

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The goal of the paper is to find out the relationship between indicators and intraday stock price using data from the United States stock market give a reasonable conclusion on how accurate the indicators reflect the stock price. Since the introduction of the electronic systems, more than 50,000 traders now trade on their stocks within intraday, referred to as day trades In this paper, we investigate whether day trading method generate abnormal return to investors. The typical technique indicators are moving average, relative strength index and slow stochastic. They are most frequency using by traders and hedge fund managers. The results are indicating the technique can able to generate the abnormal return. However the abnormal returns of few technique analyses are not significant. The distribution of abnormal return is most likely the random curve. Using the multiple indicators is the best way to generate the abnormal return in day trading.

Table of Contents

Chapter1 Introduction

1.1 Purpose of this study

The goal of the paper is to find the relationship between indicators and intraday stock price in the United States stock market to give a reasonable conclusion of that how accuracy the indicators reflects the stock price .

1.2 Introduction of US market

In general, US stock markets are a good choice for day trading, It is using T+0 trading method which is means you can trade multiple times in one stock. The US SEC makes restrictions on the day trading of US stocks, by requiring that day traders deposit at least $25,000 in cash or securities. The rules mean that day traders need to have at least $25,000 in their day trading account if they want to day trade US stock markets.

Electronic trading let the traders trading the securities and other financial derivatives electronically. Traders can trade faster and easier. People trade billions of shares of stock every day on a vast massive collection of computer systems that are surprised reliable and almost error-free.

1.3 Day Trading

Day trading is means traders hold super short position, and never hold stocks overnight. Day trader is

usually good at capture the best opportunist to enter and exit the market. They will quickly get out the business as soon as they get a tiny profit. Because the trading time is too short, so it cannot endure the risk of the price movement.

The different way to understand the speculation business cause by many traders use various way to trader their stocks. Day traders believe there are many factors can influence the market price fluctuate. This shows predict the market is difficult and inaccuracy. According the David said form his book Day trading Grain Futures:A practical guide to trading for a living, he said compare the long-term stock movement pattern, the shorter business term, which has limited factors affect the market price so the short term can predict more accuracy and smaller error. Besides the central factor affect the price in a short term is caused by the speculators.so the short term trading can easier get the constant profit.

1.4 Using method study in day trading

There are lot ways in day trading by using the technique review. For example, you can using the market moving average and use this process for next working day that buys at open/sell at high. There are many technique indicators like Bollinger bands is a variety of price volatility, Momentum is the rate of price change and Relative strength index (RSI) – oscillator showing price strength.

1.5 Organization of the Study

In this paper, I only use three important technique indicators, which are MACD, RSI and Slow

stochastic. I want to use these trees indicators to prove the technique analysis can produce profit in day trading. And I want to find which indicator is more accuracy.

Chapter 2 will present the indicators design and provide the main research method in this paper. Chapter 3 will describe the model used to test the relationship between the stock price and the indicator movement. Chapter 4 will change the time of indicators and using the intraday data to find the relationship between the stock price and the indicator movement. Chapter 5 will graph the result and compare which indicator and period are more accuracy. Finally, the conclusions will be in Chapter 6.

Chapter 2

Literature review

2.1 Moving Average Convergence-Divergence Model

Although a lot of stock pricing models have been established, it is still difficult to estimate the indicators to analysis the day trading. It is meaningful for us to do research on the predict the intraday stock price movement.

The MACD Line is the 12-day Exponential Moving Average (EMA) less the 26-day EMA. They use the closing prices to be moving averages. As its name implies, the MACD is mainly means the convergence and divergence of the two moving averages. The MACD Line oscillates above and below the zero line, which is also known as the centerline. When the 12-day EMA is over the 26-day EMA., then is called positive MACD. Positive values increase when the shorter EMA diverges pass over from the longer EMA. This is called the increasing of the upside momentum Negative MACD values indicates that the 12-day EMA is below the 26-day EMA. Negative values increase as the shorter EMA diverges further below the longer EMA. This is called increasing of downside momentum.

2.2 Relative Strength Index Model

This is another indicator to analysis the stock price. It is indicate strength or weakness of a stock or market based on the closing prices of a recent trading period. The RSI is classified as a momentum

oscillator, Momentum is the rate of the rise or fall in price. The RSI is most typically used on a 10 day timeframe, measured on a scale from 0 to 100, with high and low levels marked at 70 and 30. When the number is below 30, it means the stock price is over sought. When the indicator value over 70, it means the stock price is overbought.

The Follow formula is:

RSI = 100 - 100/(1 + RS*)

*Where RS = Average of x days' up closes / Average of x days' down closes.

The very first calculations for average gain and average loss are simple 10period averages.

Average Gain = Sum of Gains over the past 10 periods / 10.

Average Loss = Sum of Losses over the past 10 periods / 10

2.3 Slow stochastic Model

The Stochastic indicator shows the portions of the close relative to the high-low range over number of periods. It follows the speed or the momentum of price. As a rule, the momentum changes direction before price. Because the Stochastic Oscillator is range bound, is also useful for identifying overbought and oversold levels.

The indicator is defined as follows:

$$\%K = 100\frac{\text{closing price} - \text{L}}{\text{H} - \text{L}},$$

Where H and L are respectively the highest and the lowest price over the last periods, and

$$\%D = 3 \text{ period exponential moving average of } \%K.$$

There is only one valid signal in working with %D — a divergence between %D and the analyzed security.[2]

Where

Price is the last closing price

%D is a 3-period exponential moving average of %K.

A 3-line Stochastic will give an anticipatory signal in %K, a signal in the turn of %D at or before a bottom, and a confirmation of the turn in %D-Slow.[3] Typical values for *N* are 5, 9, or 14 periods. Smoothing the indicator over 3 periods is standard.

Chapter Three

Methodology

3.1 Data selection

The paper is going to find how the indicators reflect the intraday stock price; I random select 4 stocks, which are AAPL. I use 5 minutes intraday chart between April 1st 2013 and July 31st 2013. In order to calculate the Indicators in Excel, I need to download the data time from January 1st 2013 to August 1st .

3.2 Methodology

3.2.1 MACD

I am using MACD(10 26 9),Which is means The MACD Line is the 10-day Exponential Moving Average (EMA) less the 26-day EMA. My main strategies is when 10 days EMA crossing the 26 days EMA and moving up, I long buy the 100 shares stock and sell it at next 5 minutes. I record the profit of this trading activity. If the 10 days EMA cross the 26 days EMA as well as moving down, then I short the stock with 100 shares and buy it back at next 5 minutes. To find out the MACD in Excel I use the formula:

EMA slow is equal to today's close stock price/26 +(1-1/26)*previous EMA slow

EMA fast is equal to today's close stock price/10 +(1-1/10)*previous EMA fast

MACD= EMA fast - EMA slow

3.2.2 RSI

I use the 10 period of relative strength index. When the RSI is touching the 70 and moving down, I short the stock and buy back after 5 minutes. When the RSI is touching the 30 and moving up I long the stock and sell it after 5mintues. To get the data in the Excel, I use this formula in excel:

RSI = Average of price change on up days / Average of price change on down days

RS = 14-day EMA of up closing gains /14-dayEMA of down closing losses

This calculates the daily change in closing price.

3.2.3 Slow Stochastic

I use the 14 periods and Smoothing is 3 period. If the %K line reduces the 70 and moving down, then I short the stock price and buy back after 5 minutes. If the %K line greater than the 30 and moving up, then I buy the stock price and sell it after 5 minutes.

To find out the Slow stochastic in excel, I use this formula:

The formula for Fast %K for a particular day is given by the equation:

%K = (today's close price - lowest close price over 14 days)/(highest close price over past 14 days - lowest close price over past 14 days)

Slowing %K = 3-period moving average of Fast %K

3.3 New period in indicators

I change all three indicators period after I get the results form the standard period.I use MACD(5 10 9) instead of MACD(10 26 9). Besides I use 5 period in RSI instead of 10 periods and I change the Slow Stochastic to 5%K and 3%D. I use the same methods to get new result and then I compare which is the better period when I test on the intraday trading.

3.4 Abnormal return Model

Abnormal return is equal to the return of using the indicators minus the return without using the technique analysis. I will show the distribution and the data summary in the next chapter.

3.5 Multiple indicators abnormal return model

In order to find the relationship with two or more indicators, I set up a formula to check the abnormal return with multiple indicators. If two or more indicators have same effect orders at same time, then I would add these indicators abnormal return.

Abnormal return = a*MACD(10 26 9)+b*MACD(5 10 9)+c*RSI(10)+d*RSI(5)+e*RSI(5)+f*Slow Stochastic(14k)+g*Slow Stochastic(5k)+u

Where

a,b,c,d,e,f,g is equal 0 or 1, when two of the indicators has same time and same execution orders, then the they will equal to 1, otherwise is 0.

MACD,RSI,Slow Stochastic is the abnormal return in indicators.

Abnormal return is sum of the abnormal return with various indicators.

3.5 Data Resource

The stocks 5 minutes intraday data is all create the website:http//www.finam.ru/analysis/profile041CA00007/default.asp.Final is a Russian website that provides data for the stock, futures, ETF and Forex markets. The reason for choosing the data is that the data are current and can meet the recent economic research and forecasting needs.

Chapter 4

Analysis of Result

According the method I explained in chapter 3, I get several sets data of returns. First, I want to show the APPL daily return in 4 months if we just hold the 100 shares stock and sell it before daily close market time. I use the STATA to analysis the data. The mean of daily holding return is -0.0403529, and the standard deviation is 6.3184.there is 85 trading days. Compare the indicators; we first see the abnormal return of MACD in period 5,10,9. The mean of abnormal return is 0.338824, and the standard deviation is 6.337. In this technique trading method, it has positive abnormal return, but its volatile is as same as the holding daily return.

The abnormal return of MACD in period 12 26 9 has higher mean of abnormal return, and it has similarly standard deviation compare to MACD 5 10 9.So, the better technique analysis is MACD(12 26 9) between MACD(5 10 9) and MACD(12 269). Although MACD is a useful and commonly used technical indicator, it has drawbacks and, hence, investors/ traders need to take more cautious while using the MACD sign rules. This is because the power of the stock move decides the signals veiled time line. So add the trading volume will be more confirmed the trading action.

MACD is not particularly good for traders to analysis the overbought and oversold levels. Even though it is possible to identify levels that historically represent overbought and oversold levels, MACD does not

have any upper or lower limits. MACD calculates the absolute difference between two moving averages and not the percentage difference. MACD levels are difficult using over a long period of time, especially for stocks that have grown thoughtfully.

Secondly, The RSI indicators have some different results compare with MACD. The abnormal return of Relative strength index with 5 days period has higher mean value which is 0.427 and lower standard deviation which is 6.569 than the abnormal return of Relative strength index with 10 days period. As an early warning signal, the RSI divergence enables to prepare for a trend change. When the RSI and price chart lines move in the same way we get a confirming signal that the existing price trend is unlikely to change. The RSI is effectively using in trend lines and support and resistance lines. When other indicators suggest action, then the RSI trend line might also confirm this.

Third, in Slow Stochastic indicators, the abnormal return in 14 %k period and 5 %k have both negative returns. They have slightly different with tow results. However, if we see the curve of percentiles in two indicators, the 50% value is 0.04 in abnormal return of slow stochastic 14 %K, but the 50% of percentiles value is -0.03 in abnormal return of slow stochastic 5%k.

So, the slow stochastic of 5%k is better for day trading. The indicator can also be used to identify support or resistance level.

Finally, in multiple indicators analysis, it has significant abnormal return if we use multiple indicators. The

abnormal return is 0.54, which is much higher than the no action abnormal return is only -0.04. what‘s more, the standard deviation of multiple indicators is much smaller than other indicator technique analysis’s.. In multiple indicators analysis, the standard value is only 0.877, which is means the abnormal return is can bring traders constant abnormal return. In multiple indicators analysis, I find the MACD with 10 period and slow stochastic with 5 %k have most same time to action same order type. It is tell us the traders should use both MACD in 10 period and Slow Stochastic indicators when they are trading the stocks.

Chapter 5

5.1 Conclusion

According to the output, the data chosen in the sample do not track the performance of the market. The influence of APPL on indicators is different. Most indicators can bring the abnormal return; the longer period of indicators can bring smaller return but also smaller standard deviation. This is means if you want to hedge the risk of the stock, then you should use the longer period indicators, and make a constant return. The lowest standard deviation in those indicators is Slow Stochastic in 14%K. The abnormal return in longer period indicators are not significant, however the shorter period indicators can bring trader with significant abnormal return. The highest abnormal return is slow stochastic in 5%k. Compare these two example, we can find the slow stochastic is most useful indicator for day trader. The most important result is using multiple indicators not only can bring the higher abnormal return than other single indicator but also has the lower standard deviation. This is means if trader can trade the stocks by using the multiple indicators, then it can give traders huge profit in every day. The hardest part is traders must pay a lot attention in every indicator and make sure all of the indicators trigger the buy or sell signal at same time. And traders frequently use the market trader can suffer a lot trading fees. In sum the indicators is still useful and can significant give traders huge benefit in every day trading.

5.2 Limitations and Recommendations

Several limitations could accompany in the study. Firstly, some periods might not a standard data. These may cause by the problem of the process of data collection

Secondly, this paper just collect four months of data, which makes the result is not well present the market. The sample is merely enough to meet the requirement to do the test. If I enlarge the sample the output will be more favorable.

In reality trading, if the traders put the market order to trading the stocks, then they should pay the trading fee and clearing fee. So if you trade many times, the profit would decidable by the commission fees.

For further research, I would like to provide several suggestions. First, it might be better to adopt a longer time horizon. Moreover, using log-linear functional forms to do the regression model will be better. Because the stock prices change randomly, the relationship between technique analysis and stock price is not simple linear relation.

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Appendix A: Summary of the abnormal return Data

```
  ___  ____  ____  ____  ____ (R)
 /__    /   ____/   /   ____/
___/   /   /___/   /   /___/   11.1   Copyright 2009 StataCorp LP
  Statistics/Data Analysis            StataCorp
                                      4905 Lakeway Drive
                                      College Station, Texas 77845 USA
                                      800-STATA-PC        http://www.stata.com
                                      979-696-4600        stata@stata.com
                                      979-696-4601 (fax)

40-student Stata lab perpetual license:
       Serial number:  50110589590
         Licensed to:  L156D-02
                       Saint Mary's University

Notes:
      1.  (/m# option or -set memory-) 10.00 MB allocated to data
      2.  New update available; type -update all-

. *(16 variables, 87 observations pasted into data editor)
```

```
. sum abmacd5109,detail

                        ab macd 5109
-------------------------------------------------------------
      Percentiles      Smallest
 1%       -13.05         -13.05
 5%       -10.31         -12.48
10%        -7.99          -12.4       Obs                  85
25%        -3.69         -11.27       Sum of Wgt.          85

50%         -.03                      Mean           .0338824
                        Largest       Std. Dev.      6.336658
75%         3.69          11.45
90%         6.77          12.63       Variance       40.15324
95%        11.31          12.98       Skewness       .5335976
99%        24.53          24.53       Kurtosis       4.645635
```

```
99%        24.53          24.53       Kurtosis       4.645635

. sum  abmacd12269,detail

                      ab macd 12 26 9
-------------------------------------------------------------
      Percentiles      Smallest
 1%       -13.32         -13.32
 5%        -9.94         -11.57
10%        -8.74         -11.55       Obs                  85
25%        -3.47         -11.07       Sum of Wgt.          85

50%          .13                      Mean           .0885882
                      Largest         Std. Dev.      6.342034
75%         3.14            11.9
90%         7.36           13.16       Variance       40.22139
95%        10.97           14.94       Skewness       .4537002
99%        22.08           22.08       Kurtosis       3.898024


. sum  abrsi10,detail

                        ab rsi10
-------------------------------------------------------------
      Percentiles      Smallest
 1%       -15.79         -15.79
 5%       -10.32         -15.06
10%        -7.88         -12.94       Obs                  85
25%        -5.07         -12.39       Sum of Wgt.          85

50%          .33                      Mean           .0445882
                      Largest         Std. Dev.      6.992815
75%         3.69           12.52
90%         8.05           13.37       Variance       48.89946
95%        11.52            14.4       Skewness       .4455348
99%         26.2            26.2       Kurtosis       4.328895
```

```
. sum  abrsi5,detail

                          ab rsi5
-------------------------------------------------------------
      Percentiles      Smallest
 1%       -15.18         -15.18
 5%        -9.85          -12.8
10%        -7.58         -11.22       Obs                  85
25%           -4         -10.38       Sum of Wgt.          85

50%          .41                      Mean           .4268235
                        Largest       Std. Dev.      6.569436
75%         4.04          12.05
90%         8.01          12.65       Variance       43.15749
95%        11.56          15.87       Skewness       .5289476
99%        25.24          25.24       Kurtosis       4.575802


. sum  abslowstochastic14k,detail

                  ab slow stochastic 14K
-------------------------------------------------------------
      Percentiles      Smallest
 1%       -14.92         -14.92
 5%        -9.48          -14.3
10%        -7.82         -12.27       Obs                  85
25%        -3.52          -9.81       Sum of Wgt.          85

50%          .04                      Mean          -.0301176
                        Largest       Std. Dev.      6.312807
75%         3.28          10.86
90%         7.27          11.26       Variance       39.85153
95%        10.43          12.81       Skewness       .3655252
99%        22.86          22.86       Kurtosis       4.188309
```

99%	22.86	22.86	Kurtosis	4.188309

```
. sum  abslowstochastic5k,detail
```

ab slow stochastic 5k

Percentiles		Smallest		
1%	-14.21	-14.21		
5%	-9.5	-14.09		
10%	-8.91	-12.17	Obs	85
25%	-3.99	-11.8	Sum of Wgt.	85
50%	-.35		Mean	-.0851765
		Largest	Std. Dev.	6.410513
75%	3.97	11.15		
90%	6.49	12	Variance	41.09467
95%	11.11	13.05	Skewness	.3266006
99%	22.5	22.5	Kurtosis	3.913715

```
. sum  noaction,detail
```

NO ACTION

Percentiles		Smallest		
1%	-23.58	-23.58		
5%	-10.82	-14.78		
10%	-7.02	-11.47	Obs	85
25%	-3.5	-10.95	Sum of Wgt.	85
50%	-.27		Mean	-.0403529
		Largest	Std. Dev.	6.318395
75%	3.36	10.82		
90%	8.21	12.71	Variance	39.92212
95%	9.3	12.96	Skewness	-.488647
99%	13.25	13.25	Kurtosis	4.373607

```
. sum  mulitplemodelreturn,detail

                    mulitple model return
-------------------------------------------------------------
      Percentiles      Smallest
 1%         -.99           -.99
 5%         -.83           -.98
10%         -.62           -.93       Obs                  85
25%         -.11           -.86       Sum of Wgt.          85

50%          .54                      Mean           .5404706
                      Largest         Std. Dev.      .8770023
75%         1.39           1.83
90%         1.69           1.91       Variance       .7691331
95%         1.82           1.93       Skewness      -.0403092
99%         1.94           1.94       Kurtosis       1.736564
```

Appendix B: distribution of the abnormal return Data

macd 12 26 9	ab macd 12 26 9	rsi 10	ab rsi10	rsi 5	ab rsi5
-1.07	-2.27	2.83	1.63	-1.18	-2.38
1.56	0.65	1.18	0.27	-0.83	-1.74
-0.58	-2.75	-0.39	-2.56	0.24	-1.94
1.23	5.61	2.18	6.56	1.83	6.21
0.23	4.69	-2.81	1.65	-1.88	2.58
0.24	-2.79	-1.75	-4.78	-0.32	-3.35
-0.49	-1.24	-0.24	-0.99	-0.09	-0.84
1.22	-7.44	-0.16	-8.82	1.52	-7.14
0.43	1.64	2.30	3.51	1.42	2.63
-0.60	4.09	-2.08	2.60	-0.35	4.34
-1.99	7.93	2.25	12.17	-1.16	8.76
1.37	-5.21	-1.37	-7.95	0.36	-6.22
-1.07	22.51	-2.64	20.94	-0.27	23.31
1.72	12.54	-1.98	8.84	0.62	11.44
-1.67	-0.18	-2.03	-0.54	-1.90	-0.41
1.04	-7.17	-2.60	-10.81	1.69	-6.52
-1.50	-8.86	-1.94	-9.30	-0.82	-8.18
1.07	1.59	-1.68	-1.16	1.73	2.25
1.79	-1.41	-1.62	-4.82	0.65	-2.55
-0.22	-8.65	1.86	-6.57	-1.87	-10.30
-0.13	-13.09	-1.89	-14.85	1.48	-11.47
1.31	-11.40	1.84	-10.86	0.94	-11.77
1.68	5.04	-1.98	1.37	-0.54	2.82
-0.30	-6.38	2.32	-3.77	0.97	-5.11
-0.36	-4.78	1.08	-3.34	-1.33	-5.74
-1.12	-11.93	-0.53	-11.34	0.62	-10.19
-1.86	0.22	-1.40	0.68	0.02	2.10

-1.09	-6.13	0.40	-4.64	0.06	-4.98
-0.39	6.63	0.00	7.02	0.01	7.03
-0.07	3.70	-0.59	3.18	-1.23	2.53
0.85	-0.91	-2.92	-4.68	-0.62	-2.38
0.48	11.43	1.21	12.16	1.77	12.72
-0.50	14.28	0.62	15.40	1.26	16.04
-1.91	-7.47	1.59	-3.96	1.24	-4.31
1.49	2.58	-0.83	0.26	-1.81	-0.72
0.03	-9.27	-2.31	-11.61	0.74	-8.56
-0.56	3.50	1.70	5.76	-1.32	2.74
1.69	-1.11	-1.20	-4.00	1.43	-1.37
1.36	0.57	2.69	1.90	-1.17	-1.95
-1.12	-4.01	2.99	0.10	-0.19	-3.08
-0.98	2.52	-1.99	1.51	-1.10	2.40
1.68	-1.67	-1.89	-5.25	0.81	-2.55
-0.92	-7.62	1.74	-4.97	-0.03	-6.74
-0.93	1.05	-2.29	-0.31	0.78	2.76
-0.10	-0.86	0.32	-0.44	-0.01	-0.77
0.15	1.36	1.74	2.95	-1.43	-0.21
-2.00	2.09	0.39	4.47	-1.30	2.78
0.47	7.16	0.78	7.47	-1.84	4.85
-1.19	-4.55	-0.71	-4.07	-0.89	-4.25
-1.90	1.15	0.02	3.08	-1.84	1.22
-1.93	-0.86	0.57	1.65	-0.62	0.46
-1.75	3.99	0.16	5.90	1.05	6.79
0.06	-3.85	-1.59	-5.50	1.06	-2.85
-0.48	5.43	-0.36	5.54	0.12	6.02
0.57	-1.46	2.89	0.86	-0.44	-2.47
0.77	1.03	-1.32	-1.06	-1.02	-0.75
1.05	9.78	2.39	11.11	-0.02	8.70
-1.89	4.49	1.41	7.79	1.55	7.93
0.56	3.53	-1.86	1.11	0.83	3.79
-0.56	10.91	-2.76	8.71	-1.85	9.62
0.02	-0.54	2.02	1.46	1.49	0.93
1.59	6.35	0.03	4.79	-1.42	3.33
-1.94	1.32	-0.72	2.53	1.56	4.81

-0.90	-2.18	-2.45	-3.73	-1.30	-2.58
-0.59	-13.84	-2.72	-15.96	1.71	-11.53
-1.91	-10.93	2.29	-6.73	1.09	-7.93
0.84	-1.75	-2.82	-5.41	-0.87	-3.46
1.80	5.34	2.23	5.77	-0.67	2.87
0.29	2.57	-0.79	1.50	1.83	4.11
0.64	-6.42	-0.93	-7.99	-0.14	-7.20
0.55	1.95	-0.29	1.11	0.28	1.68
-0.74	-7.38	-1.47	-8.11	-1.96	-8.60
-1.64	-0.90	-2.96	-2.22	1.11	1.85
0.72	-0.12	-0.55	-1.38	0.79	-0.05
-1.70	-4.48	-2.64	-5.42	0.13	-2.65
0.28	-0.33	-1.38	-1.99	1.77	1.16
-1.87	-0.25	-1.26	0.36	0.91	2.53
-0.14	8.01	-2.355	5.80	-0.51	7.64
-1.09	2.06	-0.67	2.48	1.31	4.46
-1.32	-2.90	3.995	2.42	-0.98	-2.56
0.57	2.77	0.37	2.57	-1.81	0.39
0.91	1.87	1.07	2.03	0.33	1.29
0.09	-6.90	-0.83	-7.82	0.25	-6.74
-1.52	-4.88	2.08	-1.28	0.00	-3.36
-0.15	2.31	0.96	3.42	0.11	2.57
(14.32)	(10.88)	(20.02)	(16.58)	0.52	3.96
1.15	6.36	1.80	6.54	1.15	6.23
(0.17)	(0.13)	(0.24)	(0.20)	0.01	0.05

slow stochastic 14K	ab slow stochastic 14K	slow stochastic 5k	ab slow stochastic 5k	NO ACTION
1.03	-0.17	-0.47	-1.67	1.20
0.70	-0.21	0.44	-0.47	0.91
0.49	-1.68	-1.11	-3.28	2.18
1.78	6.16	-0.14	4.24	-4.38
0.36	4.82	1.05	5.51	-4.46
1.47	-1.56	-0.14	-3.17	3.03
-1.05	-1.80	1.73	0.98	0.75
0.55	-8.11	-1.61	-10.27	8.66
1.94	3.14	0.25	1.45	-1.21
0.61	5.30	1.98	6.66	-4.69
1.91	11.83	1.07	10.99	-9.92
-0.61	-7.19	-1.10	-7.68	6.58
1.53	25.11	-0.82	22.76	-23.58
-1.82	9.00	0.38	11.20	-10.82
-1.58	-0.09	-0.10	1.39	-1.49
0.35	-7.86	-0.49	-8.70	8.21
-1.26	-8.62	0.69	-6.67	7.36
-1.28	-0.76	0.10	0.62	-0.52
-1.14	-4.34	1.30	-1.90	3.20
-1.29	-9.72	-1.35	-9.78	8.43
1.84	-11.12	-0.63	-13.59	12.96
1.86	-10.85	-0.75	-13.45	12.71
-1.54	1.81	-1.80	1.56	-3.36

-0.11	-6.20	0.08	-6.00	6.09
-1.94	-6.36	1.46	-2.95	4.42
-0.38	-11.20	-1.57	-12.38	10.82
1.14	3.22	0.30	2.38	-2.08
1.99	-3.05	-0.97	-6.01	5.04
-0.60	6.42	0.48	7.50	-7.02
1.29	5.06	-1.91	1.86	-3.77
1.05	-0.72	0.66	-1.10	1.77
-1.77	9.18	-1.23	9.72	-10.95
0.78	15.56	0.35	15.13	-14.78
-1.00	-6.56	0.89	-4.67	5.56
0.74	1.83	-1.64	-0.55	-1.09
-1.42	-10.72	-0.62	-9.92	9.30
-0.07	3.99	-1.22	2.84	-4.06
-0.67	-3.47	-0.89	-3.69	2.80
-0.43	-1.21	1.90	1.12	0.79
-1.42	-4.30	1.58	-1.30	2.89
-0.32	3.18	1.31	4.81	-3.50
0.42	-2.94	-0.08	-3.44	3.36
0.88	-5.83	-1.51	-8.22	6.71
-1.16	0.82	1.76	3.74	-1.98
-0.76	-1.52	1.22	0.46	0.76
-1.83	-0.61	-0.66	0.56	-1.22
0.92	5.00	1.62	5.70	-4.09
1.53	8.22	0.66	7.35	-6.69
1.79	-1.57	-0.50	-3.86	3.36
0.91	3.96	-0.11	2.95	-3.06
-0.55	0.52	0.68	1.75	-1.08
-1.46	4.28	-1.89	3.85	-5.74
0.39	-3.52	0.17	-3.74	3.91
-0.59	5.32	-1.35	4.56	-5.91
-1.68	-3.72	0.91	-1.13	2.04
0.85	1.12	1.10	1.36	-0.27
-0.07	8.66	1.70	10.43	-8.73
1.14	7.52	-1.65	4.73	-6.38
1.94	4.91	0.58	3.55	-2.97

-1.54	9.93	1.53	13.00	-11.47
1.96	1.40	1.21	0.65	0.56
-1.85	2.91	-0.41	4.34	-4.76
-0.66	2.59	0.81	4.07	-3.26
-0.98	-2.26	1.99	0.71	1.28
1.09	-12.16	0.42	-12.82	13.25
0.34	-8.69	-1.64	-10.67	9.03
1.71	-0.88	-1.50	-4.08	2.59
1.49	5.03	1.80	5.34	-3.54
1.74	4.03	-0.27	2.01	-2.29
-1.39	-8.45	-1.36	-8.42	7.06
0.38	1.78	1.07	2.47	-1.40
1.51	-5.13	0.08	-6.56	6.64
-1.19	-0.45	1.37	2.11	-0.74
1.83	0.99	-1.28	-2.12	0.84
0.87	-1.91	1.05	-1.73	2.78
-1.41	-2.02	1.98	1.37	0.61
1.93	3.55	-1.10	0.53	-1.62
-1.72	6.43	0.10	8.25	-8.15
1.60	4.75	1.63	4.78	-3.15
1.46	-0.12	0.50	-1.08	1.58
-1.18	1.02	-0.67	1.53	-2.20
-1.02	-0.06	0.27	1.23	-0.96
-1.17	-8.16	1.73	-5.26	6.99
1.27	-2.09	0.37	-2.99	3.36
0.74	3.20	-0.59	1.87	-2.46
10.13	13.57	9.17	12.61	(3.44)
1.27	6.41	1.14	6.58	6.32
0.12	0.16	0.11	0.15	(0.04)

mulitple model return
-0.39
1.18
1.29
1.83
-0.06
0.78
-0.44
0.08
1.56
0.59
1.38
1.19
-0.73
1.85
0.06
1.49

−0.04
1.76
0.02
1.21
0.34
−0.92
0.61
1.55
0.45
1.92
0.43
−0.49
−0.98
1.36
0.03
1.04
1.76
1.26
1.77
0.81
1.54
−0.61
−0.20
−0.57
0.72
1.68
0.02
−0.01
−0.17
−0.89
1.90
1.79
0.07
1.52
−0.95
−0.43

0.00
-0.78
-0.93
-0.80
-0.57
1.74
1.16
1.24
0.47
0.67
0.33
0.85
0.91
-0.91
0.27
0.34
1.48
0.21
-0.89
0.90
1.38
1.30
1.61
0.74
0.02
0.67
0.21
0.46
0.83
1.04
1.70
-0.36
-0.61
45.64
0.88
0.54